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(19)


## (54) IMPROVEMENTS IN OR RELATING TO COOLING APPARATUS

(71) We, MK REFRIGERATION LIMITED, a British Company, of 15 Moorfield Road, Orpington, Kent, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:–

This invention relates to cooling apparatus and has a particularly useful but by no means exclusive application in apparatus for chilling wine in restaurants.

According to this invention there is provided cooling apparatus comprising a platform for supporting a bottle or other container, which platform is guided for vertical movement and is supported by spring means adapted to adjust the height of the platform in dependence on the weight of the container and its contents on the platform, means disposed at a predetermined height for directing a stream of water on to the container supported on the platform, a tank containing water, a refrigerating apparatus including an evaporator tube disposed in the water in the tank, and a pump connected to pump water from the tank to the means for directing a stream of water on to the container, the water being returned to the tank.

The strength of the spring means may, for example be selected so that when a half-bottle of wine is placed on the platform, the bottle is positioned at the same height in relation to the water jet or jets constituting the stream of water as a full bottle is when placed on the platform, the jet or jets in each case spraying on to the neck of the bottle.

The invention will now be described in more detail with reference by way of example to the accompanying diagrammatic drawings in which:

Figure 1 shows a first apparatus according to the invention, and

Figure 2 shows an apparatus similar to that of Figure 1 but mounted on a trolley so as to be mobile.

Referring to Figure 1, the apparatus shown is a static apparatus for use in cooling bottles of wine, for example in restaurants. A full bottle 10 and a half bottle 11, are shown on respective platforms 12, 13 each of which is guided for vertical movement and is urged upwardly by a compression spring 14 disposed between the underside of the platform and the floor of a compartment 15 in which the platforms are disposed. A series of water jets 16 are spaced above each platform to spray the bottles on the platforms and the strength of the springs 14 is such that a bottle or a half-bottle of wine on the platform is supported at a level such that the water is sprayed on to the neck of the bottle.

The water is pumped to the jets 16 from a water-tight tank 18 below the compartment 15 by an electrically driven pump 19. The pump is immersed in the water in the tank. Water falling from the bottles returns to the tank through holes 20 in the bottom of the compartment 15.

An evaporator coil 21 of a refrigerating unit 22 is disposed in the tank and is adapted to freeze the water in its immediate vicinity to form an ice bank 23 on the coil. A sensor 25 is disposed in the tank at a selected radial distance from the coil and controls the size of the ice bank by switching the refrigerating unit 22 off when the ice touches the sensor.

The refrigerating unit 22 also comprises a motor-driven compressor 26, a condenser 27, and a motor-driven fan 28 all of which are disposed in a compartment 29 at one side of the tank 16.

It was found that the constant removal of heat from the layer of wine nearest the glass of the bottle by the ice-cold water flowing over the external surface of the bottle caused convection currents to be set up in the wine, so that the rate of cooling of the

wine was found to be rapid. The cooling rate naturally depends on the quantity of water used and its temperature, the type of wine bottle and its well thickness, and the type of wine in the bottle, but it was found than on average a bottle of wine could be cooled from 80°F (26°C) to 45°F (7°C) in 10 minutes.

Figure 2 shows the apparatus of Figure 1 mounted on a trolley 31 so as to be mobile. In this case the parts of the refrigerating unit 22 other than the evaporator coil are disposed below the tank and above a 12v battery or batteries 30 which power a 12v immersion pump 19 and 12v electric motors driving the compressor 26 and cooling fan 28. A re-charging set for the battery may also be incorporated on the trolley, enabling the battery to be re-charged from the mains and the ice bank to be regenerated.

The temperature of the circulating water can be increased or decreased, depending on the wine temperature required, by adjustment of the thermostat which is actuated by sensor 25. Glycol solution or other anti-freeze compositions may be added to the circulating water to allow it to be used at lower temperature, thus accelerating the cooling.

If desired a timing device may be provided to terminate the water supply to the jets after a predetermined time interval, operation of the timing device being initiated by depression of the platform under the weight of a bottle for example, and/or a sensor may be attached to the bottle to switch off the water supply when the wine temperature drops to the required value.

Instead of jets to direct the water on to the container, one or more chutes may be provided to cascade the water over the bottle or bottles.

In a modified arrangement the compartment 15 is sub-divided, each sub-division being of a size to hold a bottle, and a means of selectively directing the water flow to the individual sub-divisions is provided, for example an external switch controlling one or more solenoid-operated check valves which in turn control the water flow to branches of the water supply system to the respective sub-divisions.

Use of the illustrated apparatus in a restaurant can provide bottles of wine at a selected temperature in the space of a few minutes, e.g. 10 minutes, and can therefore avoid the need for cold rooms which are sometimes provided in large restaurants and to which bottles have to be transferred from a store at ambient temperature. Such cold rooms take a substantial time to cool a bottle of wine and therefore require very careful management to ensure that any wine requiring cooling is always available for consumption, and are further disadvantageous in that the wines are all brought to substantially a common temperature. The illustrated apparatus also dispenses with the need for ice buckets such as are used in smaller restaurants; ice buckets are inefficient unless the ice and water are stirred frequently, and they have the further disadvantages that wine in the neck of the bottle is usually inadequately cooled and that the ice tends to damage the labels on the bottles.

WHAT WE CLAIM IS:–

1. Cooling apparatus comprising a platform for supporting a bottle or other container, which platform is guided for vertical movement and is supported by spring means adapted to adjust the height of the platform in dependence on the weight of the container and its contents on the platform, means disposed at a predetermined height for directing a stream of water on to the container supported on the platform, a tank containing water, a refrigerating apparatus including an evaporator tube disposed in the water in the tank, and a pump connected to pump water from the tank to the means for directing a stream of water on to the container, the water being returned to the tank.

2. Cooling apparatus as claimed in claim 1, wherein the platform is disposed in a compartment disposed above the tank, the water directed on to the container being returned from the compartment to the tank under gravity.

3. Cooling apparatus as claimed in claim 2, wherein the compartment is subdivided, each sub-division having a platform therein to support a container, and means being provided for selectively directing the water flow to the sub-divisions.

4. Cooling apparatus as claimed in claim 3, wherein said means for selectively directing the water flow to the individual sub-divisions comprises one or more solenoid-operated check valves controlling branches of the water supply system to the sub-divisions and switch means for selectively controlling opening and closing of the valves.

5. Cooling apparatus as claimed in any one of claims 1 to 4, wherein a sensor is disposed in the tank a predetermined distance away from the evaporator tube and is arranged to switch the refrigerating apparatus off when ice touches the sensor and to switch the refrigerating apparatus on when the water temperature in the bath exceeds a predetermined low value thereby to control the size of the ice bank formed on the evaporator tube.

6. Cooling apparatus as claimed in any one of claims 1 to 5, wherein a timing device is provided which is adapted to terminate the water supply to said means for directing a stream of water on to the container after a predetermined time interval.

7. Cooling apparatus substantially as hereinbefore described with reference to and as illustrated in Figure 1 or in Figure 2 of the accompanying drawings.

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FIG. 1

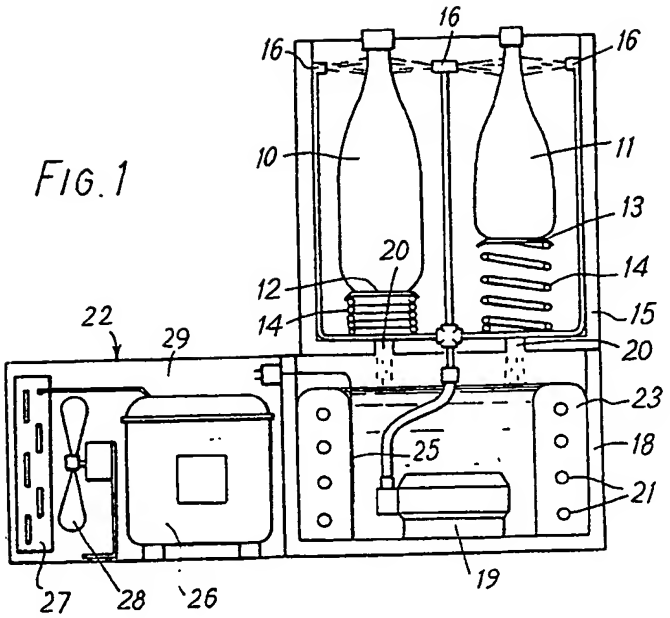


FIG. 2